MBAS 410: BUSINESS ANALYTICS

Workload	: 4 hours per week - Total credits 04
Examination	: 3 hours; 30 marks continuous evaluation &70 marks final examination.

Objectives

1. To determine which datasets are useful and how they can beleveraged to solve problems and increase efficiency, productivity, andrevenue.
2. To gain an understanding of how managers use business analyticsto formulate and solve business problems and to support managerial decision making.
3. To become familiar with the processes needed to develop, report, and analyze business data.
4. To learn how to use and apply Excel and Excel add-ins to solve business problems.
5. Understand and critically apply the concepts and methods ofbusiness analytics.
6. Identify, model and solve decision problems in differentsettings.
7. Interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or anopportunity.

Course Outcomes

1. Enable all participants to recognise, understand and apply the language, theory and models of the field of business analytics
2. Foster an ability to critically Analyze, synthesise and solve complex unstructured business problems
3. Encourage an aptitude for business improvement, innovation and entrepreneurialaction
4. Encourage the sharing of experiences to enhance the benefits of collaborativelearning
5. Instil a sense of ethical decision-making and a commitment to the long-run welfare of both organisations and the communities they serve
6. Enable data-driven decision making that has the potential to increase profits and improve efficiency
7. With predictive analytics, allow businesses to plan for the future inways that were previously impossible.

Pedagogy   Lectures, assignments, practical exercises, discussions, seminars, etc.

Module 1 Introduction: Decision Making, Business Analytics Defined, Categorizations of Analytical Methods and Models. Big Data, Business Analytics in Practice, Financial Analytics, Human Resource (HR) Analytics, Marketing Analytics, Health Care Analytics, Supply Chain Analytics, Analytics for Government and Nonprofits, Sports Analytics, Web Analytics: Matrics Vs KPI's, Target Setting, challenges in data driven decision making

Module 2: Description Statistics: Overview of Using Data- Definitions and Goals, Types of Data, Population and Sample Data, Quantitative and Categorical Data, Cross-Sectional and Time Series Data, Sources of Data, Modifying Data in Excel, Sorting and Filtering Data in Excel, Conditional Formatting of Data in Excel, Creating Distributions from Data, Frequency Distributions for Categorical Data, Relative Frequency and Percent Frequency Distributions, Frequency Distributions for Quantitative Data, Histograms, Cumulative Distributions, Measures of Location, Measures of Variability, Analyzing

Distribution – Percentiles, Quartiles, z-scores, Empirical Rule, Identifying Outlines, Box Plots. Measures of Association Between Two Variables, Scatter Charts, Covariance, Correlation Coefficient

Module 3: Data Visualization- Effective Design Techniques, Tables, Table Design Principles, Cross tabulation, PivotTables in Excel, Charts, Line Charts, Bar Charts and Column Charts, A Note on Pie Charts and 3-D Charts, Bubble Charts, Heat Maps, Additional Charts for Multiple Variables, Pivot Charts in Excel. Advanced Data Visualization, Advanced Charts, Geographic Information System Charts. Data Dashboards. Principles of Effective Data Dashboards, Applications of Data Dashboards

Module 4: Linear Regression: The Simple Linear Regression Model, Regression Model and Regression Equation, Estimated Regression Equation, Least SquaresMethod, LeastSquares, Estimates of the Regression Parameters, Using Excel's Chart Tools to Compute the Estimated Regression Equation, Assessing the Fit of the Sample Linear Regression Model, The Sums of Squares, The Coefficient of Determination, Using Excel's Chart Tools to Compute the Coefficient of Determination. The Multiple Regression Model, Regression Model and Regression Equation, Estimated Multiple Regression Equation, Least Squares Method and Multiple Regression,

Module 5: Time Series Analysis and Forecasting: Time Series Patterns- Identifying Time Series Pattern. Forecast Accuracy**.** Moving Averages and Exponential Smoothing-Forecast Accuracy. Using Regression Analysis for Forecasting-Linear Trend Projection, Seasonality, Seasonality without Trend, Seasonality with Trend, Using Regression Analysis as a CausalForecasting Method, Combining Causal Variables with Trend and SeasonalityEffects

Module 6: Data Mining: Data Sampling- Data Preparation, Treatment of Missing Data, Identification of Outliers and Erroneous Data, Variable Representation. Unsupervised Learning, Cluster Analysis, Association Rules. Supervised Learning, Partitioning Data, Classification Accuracy, Prediction Accuracy, k-Nearest Neighbors, Classification and Regression Trees, LogisticRegression

Module 7: Linear Optimization Models: A Simple Maximization Problem, Problem Formulation, Solving Linear Programs with Excel Solver, Alternative Optimal Solutions, Infeasibility, Unbounded, Sensitivity Analysis, Interpreting Excel Solver Sensitivity Report Investment Portfolio Selection, Transportation Planning, Advertising Campaign Planning, Generating an Alternative Optimal Solution for a Linear Program.

Module 8: Integer Linear Optimization Models: Types of Integer Linear Optimization Models, East borne Reality. An Example ofIntegerOptimization, The Geometry of Linear All-Integer Optimization, Solving Integer Optimization Problem with Excel Solver, Applications Involving Binary Variables- Capital Budgeting, Fixed Cost, Bank Location, Product Design and Market Share Optimization. Modeling Flexibility provided by Binary Variables- Multiple-Choice andMutually

Exclusive Constraints, k out of a Alternatives Constraint, Conditional and Co-requisite Constraints. Generating Alternatives in Binary Optimization.

Module 9: Nonlinear Optimization Models: A Production Application: An Unconstrained Problem, A Constrained Problem, Solving Nonlinear Optimization Models, Sensitivity Analysis and Shadow Prices in Nonlinear Models, Local and Global Optima, Overcoming Local Optima with Excel Solver, A Location Problem, Markowitz Portfolio Model. Forecasting Adoption of a NewProduct.

Reference Books:

1. U Dinesh Kumar, Business Analytics: The Science of Data - Driven Decision Making, Kindle Edition, Wiley, Sold by Amazon Asia-Pacific Holdings Private Limited.
2. SeemaAcharya R N Prasad, Fundamentals of Business Analytics, 2ed, Wiley, Sold by Amazon Asia-Pacific Holdings Private Limited.
3. PurbaHaladyRao, Business Analytics: An Application Focus, PHI,Rs.163/-
4. James Evans, Business Analytics, 2nd Global Edition ISBN-13: 978-12920954, Pearson.
5. SanjivJaggia and Alison Kelly and Kevin Lertwachara and Leida Chen,Business Analytics, 1st Edition, McGrawHill.
6. Jeffrey D. Camm | James J Cochran | Michael J. Fry | Jeffrey W. Ohlmann, Essentials of Business Analytics, 2nd Ed, (2017), Cengage.
7. Jeffrey D Camm, Essentials of Business Analytics, 1st Ed, (2015), Cengage.
8.SandhyaKuruganti and HindolBasu, Business Analytics: Applications toConsumer Marketing (2015), McGraw Hill,

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